NORTHERN CENTRAL DIVISION.

OHIO.

The forests of Ohio were originally composed of deciduous species, among which, in the eastern and especially in the northeastern counties, white pine and hemlock existed in isolated bodies of no great extent.

The original forest has now been generally removed, except from Ottawa, Miami, Montgomery, and a few other western counties, and from swamps and other lands unfit for agriculture; everywhere the walnut and other valuable timbers have been culled, and Ohio must soon depend almost exclusively for the lumber which it consumes upon the northern pineries and the hard-wood forests of the south.

During the census year 74,114 acres of woodland were reported destroyed by fire, with an estimated loss of $797,170. Of these fires the largest number was traced to carelessness in clearing land, to hunters, sparks from locomotives, etc.

The production of cooperage stock has long been an important industry in the state; it has already suffered from a scarcity and deterioration of white oak, for which elm, beech, maple, and poplar are now often substituted. Manufacturers of wheel stock, furniture, woodenware, etc., report abundant material for present consumption.

Ohio is sixth among the states in the volume of its lumber-manufacturing interests. The business is widely distributed throughout the state, generally in the hands of small manufacturers operating portable mills, which threaten the rapid destruction of the remnants of her forests.

INDIANA.

Indiana was once almost entirely covered with noble forests of deciduous trees. Along its western borders these were interrupted, however, by numerous small prairies, the extreme eastern outposts of the great treeless region which, toward the north, extended over the counties of Benton, Newton, and Jasper, and over considerable portions of Lake, Porter, La Porte, Pulaski, White, Tippecanoe, and Warren counties. These prairies have gradually decreased in area with the settlement of the country, and those originally of small extent are now covered with a vigorous growth of the forest trees of the region.

The forests of Indiana are characterized by an almost entire absence of coniferous trees. Stunted white and gray pines occupy the sand-dunes which border the southern shores of lake Michigan, and "the knobs"—low, gravelly hills of small extent, in the southeastern river counties—are covered with a heavy growth of the Jersey pine. Swamps in the southwestern counties contain cypress, which finds here the northern limit of its distribution. The broad bottom lands and low ridges of this part of the state are covered with a forest growth probably unsurpassed in the development of individual trees, and rarely equaled in the richness of its composition.

The forests of the state have been largely removed in the development of its agriculture. No large bodies of the original timber remain. The black walnut with which the forests of Indiana once abounded has been everywhere culled and is now rare, while the best yellow poplar, oak, and other valuable timbers have been largely consumed.

During the census year 90,427 acres of woodland were reported injured by fire, with an estimated loss of $130,335. These fires were set by farmers carelessly clearing land, by hunters, and by sparks from locomotives.

The forests of Indiana have long supplied material for a large manufacture of cooperage stock, furniture, wagon stock, woodenware, etc. The cooperage and furniture manufacturers already feel the scarcity and deterioration of the highest grades of oak and walnut, and very generally predict the entire exhaustion at no very distant day of the forests of the state.

Indiana is fifth among the states in the value of its lumber-manufacturing interests. Evansville, upon the Ohio river, in Vanderburgh county, is an important manufacturing center on account of the capital invested there in he lumber business and the amount of its product. The business, however, as in Ohio, is generally in the hands of small manufacturers operating portable mills and sawing logs hauled to them by farmers. At the present rate of destruction the forests of the state must soon lose all commercial importance.

ILLINOIS.

The forests of Illinois were originally confined to the southern portion of the state, the broad bottom lands of the Mississippi and the Illinois, and the southern third of the delta formed by these rivers. The remainder of the state was covered by broad, rolling prairies. The forest growth in this prairie region was confined to the narrow river bottoms and occasional open park-like groves of burr, scarlet, red, black-jack, or post oaks, known as "oak openings",

through which the prairie fires swept, destroying all undergrowth, without doing great injury to the full-grown trees. Prairie fires have gradually decreased in frequency and violence since the settlement of the state, and these open groves are now filled with a vigorous growth of young seedlings and shoots; their characteristic features have disappeared, and the area of the forest is gradually increasing.

The shores of lake Michigan are covered with a stunted growth of white pine; the dry, rocky hillsides in the western part of Union county, one of the southern counties of the state, bear a few yellow pines (*Pinus mitis*), and cypress is found in the southern river swamps. With these exceptions, of little importance commercially, the forests of Illinois are composed of deciduous species.

During the census year only 48,691 acres of woodland were reported destroyed by fire, with an estimated loss of $45,775. These fires were generally traced to hunters, and to farmers permitting brush fires to escape to the forest.

The production of cooperage stock was once an important industry in southern Illinois. The business has greatly diminished, owing to the exhaustion of the local supply of the best hard woods. Bass, gum, hackberry, elm, sycamore, and other woods formerly considered of little value, are substituted for oak, and Illinois now receives most of its hard wood from Kentucky, Tennessee, and other southern states.

Illinois is eleventh among the states in the volume of its lumber-manufacturing interests. It owes this position to the fact that many large mills sawing pine logs rafted down the Mississippi river from the forests of Wisconsin are established within its borders, and not to the extent and value of the forests of the state. The manufacture of Illinois-grown lumber is small and totally inadequate to supply the wants of the present population of the state.

Chicago, owing to its general commercial importance and its position with reference to the great pine forests of the northwest, has become the greatest lumber-distributing center in the world.

According to the statistics gathered by the *Northwestern Lumberman* of Chicago, and published in that journal January 29, 1881, there were received in Chicago during the year 1880 1,419,974,000 feet of lumber by lake and 145,563,118 feet by rail, a total of 1,565,537,118 feet, an increase of 96,817,127 feet over the total receipts of 1879; 650,922,500 shingles were received during the same year.

Lumber was received from the lake ports during the year 1880, as follows:

Points of shipment.	Lumber.	Shingles.	Points of shipment.	Lumber.	Shingles.
	Feet.	*Number.*		*Feet.*	*Number.*
Ahnapee	150, 000		Menominee	225, 110, 000	700, 000
Alpena	4, 517, 000		Monastique	202, 000	
Ashland	5, 200, 000	1, 311, 000	Muskegon	451, 854, 000	23, 660, 000
Bay de Noquet	3, 670, 000		North Bay	110, 000	
Bayfield	980, 000		Oconto	11, 003, 000	305, 000
Benton	3, 876, 000		Ontonagon	2, 503, 000	2, 886, 000
Black Creek	4, 825, 000		Oscoda	739, 000	
Black River	6, 858, 000		Packard's pier	2, 681, 000	
Canada ports	755, 000		Paul's pier	560, 000	
Caseville	200, 000		Pensaukee	6, 866, 000	3, 100, 000
Cedar River	17, 383, 000	100, 000	Pentwater	9, 506, 000	25, 572, 000
Charlevoix	1, 541, 000		Perry's pier	45, 000	
Cheboygan	33, 250, 000		Peshtigo	51, 600, 000	7, 920, 000
Clay Bank		650, 000	Pierport	3, 355, 000	
Copper Harbor	70, 000		Point Saint Ignace	12, 935, 000	
Cross Village	233, 000		Portage Lake	735, 000	
Depere	250, 000	1, 611, 000	Port Huron	344, 000	
Duck lake	1, 340, 000		Port Sheldon	180, 000	
Escanaba	5, 182, 000	3, 457, 000	Red River	200, 000	3, 857, 000
Ford River	17, 850, 000	6, 915, 000	Rogers City	1, 966, 000	
Frankfort	9, 565, 000		Saginaw River	11, 926, 000	
Grand Haven	90, 166, 000	114, 000, 000	Saint Joseph	1, 662, 000	
Green Bay	1, 577, 000	22, 562, 000	Saugatuck	4, 014, 000	4, 000, 000
Hamlin	12, 822, 000	11, 026, 000	Sault Ste. Marie	522, 000	
Hancock	300, 000		Silver Lake	2, 185, 000	600, 000
Holland	857, 000		South Haven	3, 650, 000	300, 000
Kewaunee	110, 000	5, 881, 000	Sturgeon Bay	11, 640, 000	19, 978, 000
L'Anse	9, 430, 000	170, 000	Suamico	3, 065, 000	2, 480, 000
Leland	970, 000		Traverse	23, 280, 000	
Lincoln	1, 295, 000	300, 000	Whitefish Bay	730, 000	
Ludington	103, 713, 000	34, 330, 000	White Lake	66, 603, 000	24, 756, 000
Ludwig's pier	125, 000		Total	1, 419, 974, 000	583, 340, 000
Mackinaw City	275, 000		Receipts by rail	145, 563, 118	67, 582, 500
Manistee	165, 217, 000	259, 911, 000			
Manitowoc	70, 000	300, 000	Grand total	1, 565, 537, 118	650, 922, 500
Marquette	2, 411, 000	522, 000			
Masonville	1, 030, 000				

Lumber was received by rail during the year 1880, as follows:

Names of lines.	Lumber.	Shingles.
	Feet.	*Number.*
Baltimore and Ohio railroad	9, 000, 000	
Chicago and Alton railroad	988, 000	70, 000
Chicago and Eastern Illinois railroad	26, 799, 000	
Chicago and Grand Trunk railway	1, 506, 418	80, 000
Chicago and Northwestern railway	11, 727, 900	44, 642, 000
Chicago, Burlington, and Quincy railroad	3, 716, 800	
Chicago, Milwaukee, and Saint Paul railway	12, 473, 000	13, 180, 500
Chicago, Rock Island, and Pacific railway	2, 224, 000	
Illinois Central railroad	2, 940, 000	
Lake Shore and Michigan Southern railway	18, 636, 000	1, 385, 000
Michigan Central railroad	24, 798, 000	8, 175, 000
Pittsburgh, Cincinnati, and Saint Louis railway	12, 481, 000	
Pittsburgh, Fort Wayne, and Chicago railway	17, 567, 000	50, 000
Wabash, Saint Louis, and Pacific railway	610, 000	
Total	145, 563, 118	67, 582, 500

The following account of the early lumber trade of Chicago is condensed from a paper prepared by Mr. George W. Hotchkiss, secretary of the Chicago lumber exchange, and printed in the *Northwestern Lumberman* under date of March 19, 1881:

"Colonel Mann, residing at Calumet, brought the first raft of lumber to Chicago. It was square building timber, poled from the mouth of the Calumet to the mouth of the Chicago river. The value of this raft was $100, and its owner found considerable difficulty in disposing of it. In 1834 or 1835 Captain Carver opened a lumber-yard on the river bank, near the present site of the State-street bridge, and about the same time a man named Harrison owned a small schooner which went to some point across the lake and brought in white wood. This little vessel could not enter the river, on account of the bar across its mouth, and her cargo was unloaded upon scows and rafts, which were floated southward for half a mile or more, around the end of the bar, before they could be headed for the deep water of the river. In 1835 or 1836 a man named Rossiter had a small dock and yard on the river, between Clark and La Salle streets, and by this time other yards were started on the river. About the year 1836 a man named Cammack had a pit-mill on the north branch of the river. His son acted as pit-man, the old man being the top-sawyer. It is not unlikely that the first lumber used in Chicago was manufactured by this method, although about the same time a wind saw-mill was located not far from the present Kinzie-street bridge, which found abundant occupation in sawing white-wood timber, which then grew in the immediate neighborhood, mixed with elm, ash, basswood, and a few oak trees. History does not record, however, that the market was overstocked by the product of this mill, or that the lumber dealers of that day hurried to issue a new price-list low enough to crush the aspirations of their dangerous competitor. In fact, history is so perfectly silent upon the subject of this saw-mill that it is probable its work did not cut much of a figure in the lumber trade of that day, and that, in fact, it proved a veritable windmill, of less caliber than the muscle of the Cammacks, who no doubt found greater profit, if harder work, in driving their pit-saw. Captain Carver's lumber-yard was on the river bank, just west of the present State-street bridge, having a light, temporary dock, upon which the small vessels bringing lumber to the river unloaded. There was at this time (1836 or 1837) no other lumber-yard in the village upon the river. Captain Carver afterward (about 1839) sold out to George W. Snow, who occupied the same ground for a number of years.

"The earliest lumber of which Mr. Hilliard has any recollection came from Saint Joseph, Michigan; but shortly after his arrival at Chicago a man named Conroe built a mill at Manitowoc, Wisconsin, and Jones, King & Co., who were then doing a hardware and general business, received and handled his lumber as a side issue. A small pocket saw-mill, built by a man named Huntoon, in 1836, was located on the river bank not far from the present Chicago-avenue bridge. It was too small to do much work, but was esteemed a very useful and really wonderful mill at that time. The North Side was pretty well timbered with elm, oak, and white wood, and from this timber the mill obtained its stock. After the streets were cut out the wet nature of the ground compelled one who would visit this saw-mill to pick his way to it by jumping from log to log. It was so far from the village to the mill that it was seldom visited, except by those who enjoyed a Sunday walk and could find no objective point of greater interest for their stroll. The lumber-yard of Tuckerman & Higginson was located in 1843 on the north side of the river, near the present northwest end of Clark-street bridge. Clark street above Kinzie street had been cleared of timber, and a clear view was to be had as far as the eye could reach in a western direction, broken only by a few scattering trees which had been left as sentinels upon the plain. At this time George W. Snow had a yard on the river, near State street, and a Mr. Rossiter had also a yard between Newberry & Doles' warehouse, on the south branch of the river, west of what is now Clark street. Barber & Mason had a yard a little farther west, near Wells street. J. M. Underwood and Sylvester Lind each had a yard on the west side of the river, near Randolph

street. This was in 1844. Mr. Higginson obtained his supply of lumber in those days from Hall & Jerome, of Menominee, Michigan, Elisha Bailey, of Peshtigo, Wisconsin, and ——— Fisk, of Depere. In 1845 he had a contract for 1,000,000 feet with William F. Ferry, of Grand Haven. Lumber came also from Kalamazoo river, Saint Joseph, and Muskegon. In 1844 Mr. Higginson purchased a cargo from Mr. Rose, of Muskegon, and, as it was a beautiful lot of lumber, running 33⅓ per cent. upper grades, he was willing to pay a good price, obtaining it at $5 75 per thousand feet. The first cargo of Saginaw lumber which reached Chicago was brought by James Fraser, one of the original proprietors of the plat of Bay City, who built two mills at Kawkawlin, in latter years known as the Ballon mills. This was in the year 1847 or 1848, and the cargo attracted a good deal of attention, because it was the first lot of circular-sawed lumber that had ever been seen by any of the dealers, and because of its general cleanness of appearance, the attractiveness of a lot of circular-sawed sidings among it, and its excellent quality. All these combined to make the cargo a novelty in its way, and it found a sale at $8 per thousand feet, an extra good price for those days. Average cargoes at this time were quoted at $6 50 to $7 for mill-run lumber, culls out, and it did not need a very coarse piece to rank as a cull. Culls were rated at half price. The retail market held common lumber at about $8 during the summer, and $9 was asked for dry lumber through the winter. Common included everything below first and second clear; third clear, selects, picks, and finishing grades generally, being an invention of a later day. First clear sold at from $12 to $16, and second clear at $10 to $12; clear, undressed flooring brought $12, and common flooring $10. The lath trade was mostly in what was known as board lath, although narrow lath arrived in small quantities. The trade of the city in 1843 was about 12,000,000 feet, and this was considered as remarkable as to us were last year's sales of 1,500,000,000 feet, or about 140 times as much more."

MICHIGAN.

Michigan once possessed a tree covering of great density, richness, and variety. The hard-wood forests of the Ohio valley covered the southern portion of the state, extending to just north of the forty-third degree of latitude. North of this hard-wood belt the character of the forest changed; the white pine appeared, occupying the drier and more gravelly ridges, and, gradually increasing in size and frequency, became the most important element in the forests of the central and northern portions of the southern peninsula. In the northern peninsula, especially in the basin of the Menominee river, it covered the sandy plains almost to the exclusion of other species. The forests of hard wood, occupying low, rich soil between the pine-covered ridges, were valuable in their stores of sugar maple, birch, ash, beech, oak, and other northern trees, while the swamps common in the northern part of the state abounded in tamarack and yellow cedar of large size and excellent quality.

North of the central portion of the lower peninsula large tracts of barren plains exist. One of the most extensive of these tracts occupies a considerable portion of Crawford county, covering an area of several hundred square miles. A second barren region exists in Lake county, and there are others in Ogemaw and Iosco counties; similar barrens occur in the northern peninsula, the largest in Schoolcraft and Marquette counties. The soil covering these barrens is a light sandy loam, supporting a stunted growth of gray pine, birches, poplars, and scrub oak. These sandy plains owe their existence, perhaps, to the continual burning of the forest, prostrated possibly, in the first instance, by tornadoes, and thus affording abundant material for a fire hot enough to consume the vegetable mold of the surface and render the soil unfit to produce a second growth of heavy timber, or in many instances any tree growth whatever.

Serious inroads have already been made upon the forests of Michigan. The hard wood has been generally cleared from the southern counties, now largely occupied by farms, and the timber remaining in this part of the state, in small, scattered bodies, can hardly suffice for the wants of its agricultural population. The merchantable white pine has been cut from the banks of the principal streams and the shores of the lakes, and what now remains is remote from water transportation or scattered in isolated bodies of comparatively small extent. The hard-wood forests of the pine belt, however, although greatly injured by fire in parts of the state from which the pine has been cut, and invaded along their southern borders by agricultural settlements, contain, especially in the northern third of the lower peninsula and through the northern peninsula, vast quantities of valuable timber.

FOREST FIRES.

The forests of Michigan have long suffered from destructive fires. These have generally originated in the neighborhood of the loggers' camps or upon the farms of the agricultural pioneer, while the virgin forest has generally, although not always, escaped serious conflagrations. The timber-prospector and the hunter are responsible for many fires in the primeval pine forest of the northwest; but, as a rule, fires follow and do not precede the lumberman. The reason is obvious: The logger in his operations leaves the resinous tops, branches, and chips of the pine trees scattered far and wide; these by the following midsummer become dry as tinder, and afford abundant material to feed a fire started by a careless hunter, log-cutter, or farmer clearing land near the forest. Such fires, which too often follow the cutting of pine forests of the northwest, have inflicted incalculable injury upon the country. They have destroyed vast quantities of hard-wood timber; they have consumed the young

DENSITY OF FORESTS

COMPILED UNDER THE DIRECTION OF
C. S. SARGENT, SPECIAL AGENT
1883.

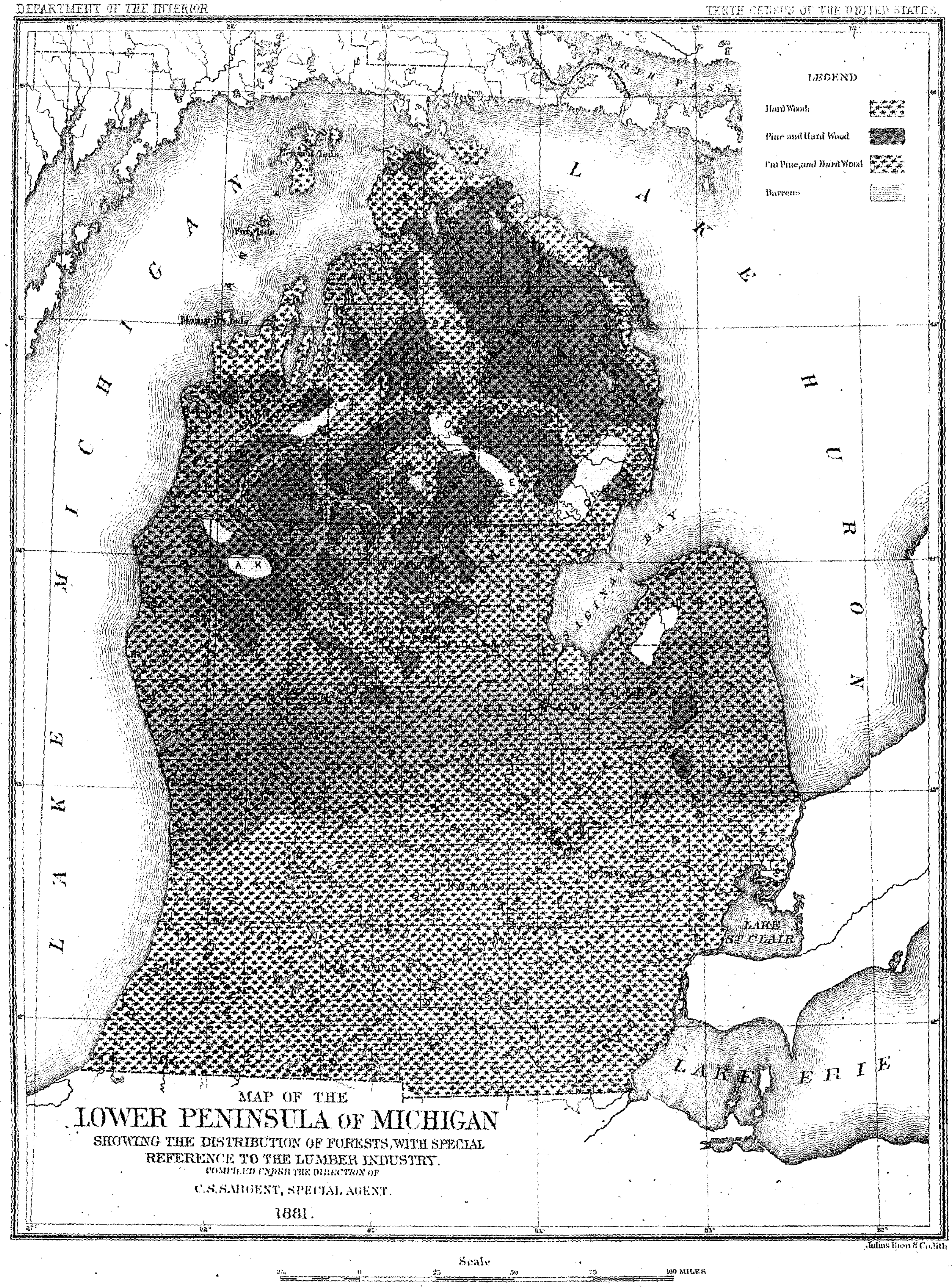
Scale

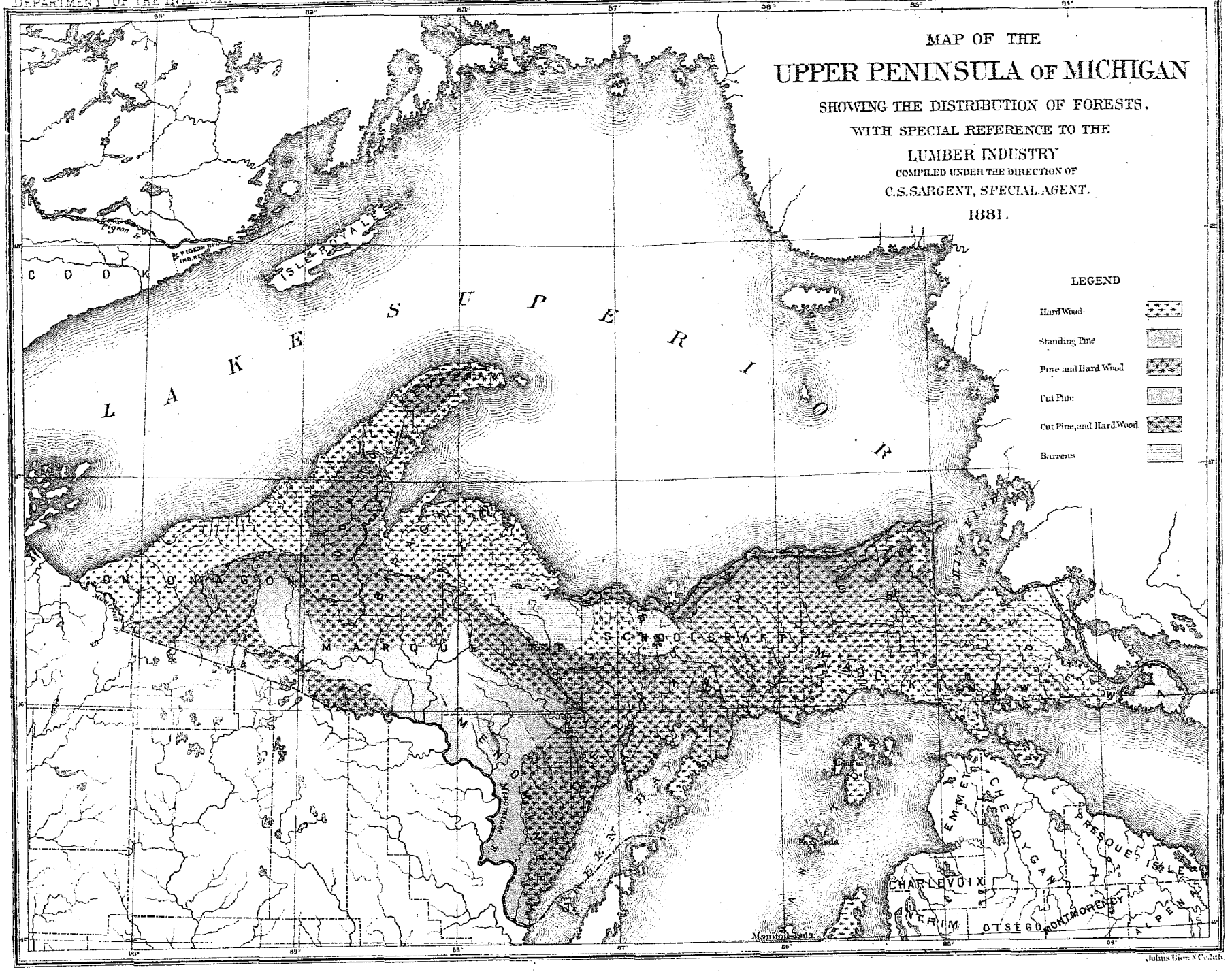
LEGEND.

I	Under 1 cord per acre
II	From 1 to 2 " " "
III	" 2 " 5 " " "
IV	" 5 " 10 " " "
V	" 10 " 20 " " "
VI	" 20 " 50 " " "
VII	Over 50 " " "

MICHIGAN, WISCONSIN, MINNESOTA, IOWA.

Julius Bien & Co. lith.


LEGEND
Hard Wood.
Pine and Hard Wood.
Cut Pine, and Hard Wood.
Barrens.
LAKE MICHIGAN
LAKE HURON
SAGINAW BAY
LAKE ST. CLAIR
LAKE ERIE
Manitou Isds.
Fox Isds.
MAP OF THE
LOWER PENINSULA OF MICHIGAN
SHOWING THE DISTRIBUTION OF FORESTS, WITH SPECIAL
REFERENCE TO THE LUMBER INDUSTRY.
COMPILED UNDER THE DIRECTION OF
C. S. SARGENT, SPECIAL AGENT.
1881.
Julius Bien & Co. lith
Scale
25 0 25 50 75 100 MILES



Julius Bien & Co. Lith.

pine trees left by the logger; they have robbed the soil of its fertility, and made it unfit to produce another crop of pine until the growth and decay of generations of other plants shall have restored its lost constituents. In the dense, unculled forest, on the other hand, fires, although often destructive, are less dangerous in the absence of dead material to feed the flames than when the ground is strewn with dead branches, tops, and resinous chips.

During the census year only 238,271 acres of woodland were reported destroyed by fire, with an estimated loss of $985,985. Of the 267 fires reported, 161 were traced to fires set in clearing land for agricultural purposes, and which escaped to the forests; 59 to hunters, 43 to sparks from locomotives, 3 to smokers, while only 1 was reported set by Indians.

The hard-wood forests of Michigan have long afforded abundant material for large and important industries engaged in the production of cooperage stock, handles, oars, agricultural implements, excelsior, wood pulp, etc. Manufacturers, especially in the southern part of the state, now report, however, a scarcity and general deterioration of stock. The best oak timber has been everywhere culled to supply the wants of railroads or the demands of the Canadian market. Elm, bass, and other soft woods, which a few years ago were considered of little value, are now in great demand and are fast disappearing, except from regions remote from railroads. Much hard wood, especially in the southern peninsula, has been destroyed by fire, or, if not destroyed, rendered almost worthless for manufacturing purposes by partial burning.

Next to Vermont and New York, Michigan produces a larger amount of maple sugar than any other state. During the year 1879 3,423,149 pounds were manufactured in the state.

STATISTICS OF GROWING TIMBER.

The following estimates of the merchantable timber standing in Michigan May 31, 1880, were prepared by Mr. H. C. Putnam, of Eau Claire, Wisconsin, with the assistance, in the lower peninsula especially, of Mr. G. W. Hotchkiss. These, as well as the estimates of the timber resources of Wisconsin and Minnesota, were obtained by compiling the results of actual surveys, and have been further verified by a large number of persons familiar with the forests in the different regions of these states. It must not, however, be forgotten that the figures given represent estimates, and not facts. Statistics of the volume of any growing crop are difficult to obtain and always liable to considerable error, and the forest, from its very nature and the extent over which it is spread, presents greater difficulties to the collector of statistics of productive capacity than the more compact and more easily studied crops of the field. The estimates of pine include all trees 12 inches in diameter 24 feet from the ground. Since they were prepared the scarcity of white pine has changed the methods of the lumberman, and trees are now generally estimated and cut as small as 8 inches in diameter 24 feet from the ground. If the amount of standing pine had been estimated upon the 8-inch basis it would have added (roughly) 10 per cent. to Mr. Putnam's figures. Small bodies of pine remote from streams no doubt exist in different parts of Michigan, Wisconsin, and Minnesota, in the aggregate of some commercial importance, which are not included in these estimates. The following figures, however, are believed to represent with as great accuracy as is attainable the productive capacity of the northwestern pineries. They cover the entire region, and these pine forests now contain no great body of unexplored timber, an unknown factor in the country's lumber supply:

WHITE PINE (*Pinus Strobus*).

Regions.	Feet, board measure.
LOWER PENINSULA.	
Basins of streams flowing into Saginaw bay, including Saginaw river and tributaries.	7,000,000,000
Basins of streams flowing into lake Huron	8,000,000,000
Basins of streams flowing into lake Michigan	14,000,000,000
Total	29,000,000,000
Cut for the census year ending May 31, 1880 (including 2,988,000,000 shingles and 428,445,000 laths, but exclusive of 36,000,000 staves and 3,330,000 sets headings).	4,068,773,000
UPPER PENINSULA.	
Basin of Menominee river and tributaries (Marquette and Menominee counties).	1,600,000,000
Ontonagon, Houghton, Keweenaw, Baraga, Marquette (west and north of Menominee basin), and Menominee (east of Menominee basin) counties.	2,400,000,000
Schoolcraft, Chippewa, Mackinac, and Delta counties	2,000,000,000
Total	6,000,000,000
Cut for the census year ending May 31, 1880 (including 106,482,000 shingles and 34,266,000 laths).	328,438,000

An estimated amount of 575,500,000 cords of hard wood is distributed over some 20,000,000 acres in the lower peninsula. Of this about 20 per cent. is suitable for lumber and cooperage stock. The cut of hard wood for the census year ending May 31, 1880 (exclusive of 163,821,000 staves and 18,567,000 sets headings, and including 6,038,000 feet of spool stock), was 440,944,000 feet. In scattered swamps there are standing some 5,000,000 cords of yellow cedar (*Thuya occidentalis*).

From Menominee and Delta counties the merchantable pine has been almost entirely removed. Baraga county contains little pine, and Keweenaw county a single considerable body some 30,000 acres in extent.

The northern portion of Ontonagon and Marquette counties is chiefly covered with hard wood.

An estimated amount of 124,500,000 cords of hard wood is distributed over some 10,000,000 acres in the upper peninsula. The cut of hard wood for the census year ending May 31, 1880 (exclusive of fuel and railroad ties), was 1,145,000 feet.

The southern counties of the upper peninsula contain large areas of swamp, covered with tamarack and yellow cedar (*Thuya occidentalis*), estimated, in the aggregate, at 62,500,000 cords.

Some 7,000,000,000 feet of hemlock lumber and 7,000,000 cords of bark still remain in the state.

Michigan is first among the states in the volume and value of its lumber product. Its principal centers of lumber manufacture are Muskegon, on the shores of lake Michigan, the shores of Saginaw bay, in Bay county, the Saginaw river, in Saginaw county, Manistee, and Menominee, in the upper peninsula. The valley of the Saginaw was long the seat of the most important lumber-manufacturing operations in the United States. Its supremacy, however, has departed with the destruction of the splendid pine forest which covered its water-shed, and the center of manufacture has moved westward from the shores of lake Huron across the peninsula to the waters flowing into lake Michigan.

Lumber was first manufactured in the Saginaw valley as early as 1832. Three years later a second mill, with an annual capacity of 3,000,000 feet, was built upon the Saginaw. In 1836 the first shipments of lumber were made from this mill, and from that time forward great attention was given to the manufacture of lumber for shipment. The commercial panic of 1837, however, seriously interfered with the development of this business, and it was not until 1849 that mills began to multiply. In 1844 there were 23 mills upon the Saginaw, with an aggregate capacity of 60,000,000 feet. Ten years later the number of mills had increased to 82, manufacturing 425,000,000 feet of lumber, while in 1873 there were 83 mills, which produced that year 567,000,000 feet. Since 1870 there has been an almost steady decrease in the number of mills operating in the Saginaw valley; the number finishing their "cut out" is fast increasing, and those destroyed by fire are not rebuilt. But, although the number of mills has decreased, their production has increased, their present capacity being estimated at 923,000,000 feet. A large part of the lumber manufactured upon the Saginaw is transported by lake to Ohio and New York ports, and thence to the principal eastern markets, although a considerable amount is shipped by vessel to Chicago and Milwaukee, and thence distributed by rail through the west. The wide market open to this lumber is due to its excellent quality. Twenty years ago logs which would run 25 per cent. "uppers" were considered common; 40 per cent. was the rule, and as high as 75 per cent. "uppers" was sometimes obtained. Logs were then cut from the lower trunk of the tree below the tops, and only the largest trees were selected. Now land which has been cut over three times is gone over again, and lumbermen are satisfied if logs yield 10 per cent. "uppers".

Of late years considerable changes have been introduced into Michigan lumbering operations by railroad logging; by this means mills are able to obtain a constant supply of logs by railroads built into the forest for the purpose, and this supply can be regulated almost entirely by the demand. There are several roads in different parts of the state doing this business, the principal being the Flint and Pere Marquette and the Lake George and Muskegon River railroads. The growth of this business in the Saginaw valley and at Muskegon, Manistee, and on the Flint and Pere Marquette road is shown by the following table extracted from *Bradstreet's* of February 5, 1881:

Years.	Saginaw valley.	Muskegon.	Manistee.	Flint and Pere Marquette railroad.
1865	200,000,000	108,505,700	.....	.....
1866	209,000,000	157,468,300	.....	.....
1867	429,207,808	288,502,200	.....	.....
1868	446,960,583	213,692,600	.....	.....
1869	321,350,068	267,789,900	.....	.....
1870	623,397,353	198,862,600	121,221,395	.....
1871	521,706,927	250,000,000	142,369,817	.....
1872	645,285,278	315,000,000	155,556,729	.....
1873	680,979,461	376,035,037	179,820,243	.....
1874	580,225,404	224,571,527	182,218,383	.....
1875	534,849,701	309,038,418	168,926,197	.....
1876	572,229,472	299,525,919	147,724,241	.....
1877	651,567,948	312,285,951	152,221,548	.....
1878	558,079,674	340,990,055	178,542,869	.....
1879	780,182,286	432,431,679	211,722,030	14,357,670
1880	948,174,274	380,000,000	211,971,000	87,485,547

The following extracts are made from Mr. Putnam's report upon the forests of Michigan:

"The southern boundary of the pine forest in Michigan may be represented by a line drawn from Sarnia westward across the state nearly to the mouth of the Kalamazoo river. Originally the pine forest covered the northern two-thirds of the state, and estimates made in 1835 gave the amount of pine then standing as 150,000,000,000 feet. This estimate included the northern peninsula. The present estimate of the pine standing in the whole state, the northern peninsula also included, is 35,000,000,000 feet. There are now remaining no large bodies of standing pine in the state which have not been more or less cut into, and the timber adjacent to streams has all been cut. The pine now remaining is scattered generally through the northern half of the state, lying back at a distance of from 2 to 10 miles from streams large enough to float the logs. The best pine in the state has been cut. The belt of pine which ran through the center of the state, extending north from the southern boundary of the original pine forest for some 75 miles, contained the best pine in the northwest. This pine was what was called by lumbermen 'cork pine', a soft white pine, large and sound, with a thick bark. The quality of the pine of the Saginaw valley was particularly fine, too; that on the west shore was of smaller size.

"The standing pine on the lower peninsula of Michigan is estimated at 29,000,000,000 feet, of which there are in the Saginaw valley about 7,000,000,000 feet, including the pine upon the Saginaw, Au Sable, and Cheboygan rivers and their tributaries; on the streams flowing directly into lake Huron there are some 8,000,000,000 feet more; making 15,000,000,000 feet upon the streams of the east shore. On the western shore of the state there are 14,000,000,000 feet, including the pine upon the Kalamazoo, Black, Grand, Muskegon, White, Pentwater, Aux Bec Scies, Boardman, and Pine rivers. As before stated, the quality of the timber in the eastern portion of the state is better than that upon the west shore; this is smaller and partakes more of the sapling nature, while that on the east shore is largely cork pine. The pine of the east shore and Saginaw valley is largely used for finishing lumber, and should be transported to the east; indeed all the pine in the lower peninsula of Michigan is wanted at the east, and none should be sent west. The pine of the western shore is suited for fencing, flooring, and dimension stuff, being smaller and containing more knots and sap.

"The largest bodies of pine left in the lower peninsula are in the counties of Presque Isle, Montmorenci, Alpena, Alcona, Ogemaw, Roscommon, Crawford, Missaukee, Wexford, Manistee, Grand Traverse, Lake, Osceola, Clare, Gladwin, and Charlevoix. There are bodies of pine also in other counties from 15,000 to 20,000 acres in extent which have not yet been cut. The pine left in the lower peninsula is generally scattered through hard-wood timber, into which the settlers are now entering, clearing the hard-wood forests and exposing the pine to destruction by fire and windfall. This destruction has largely increased with the settlement of the country, and will increase still more unless stringent measures can be taken to protect the pine forests from waste.

"The southern part of the state outside the pine belt was originally covered with a dense forest of hard-wood timber; this region is now largely settled and is the farming region of Michigan. There is a large amount of hard-wood timber of commercial value still scattered through this farming country, particularly in its middle and northern parts. Along the west shore as far north as the straits of Mackinaw the pine has been cut in large quantities, but there is still a large amount of hard-wood timber left upon this area.

"The pine of the northern peninsula of Michigan is estimated at 6,000,000,000 feet. This includes the pine from the Saint Mary's river westward to the Wisconsin line and the mouth of the Montreal river, and upon the south shore of lake Superior. It is divided as follows:

"1. On the Menominee river and tributaries, 1,600,000,000 feet.

"2. In the western portion of the peninsula, not including the Menominee and tributaries, but including all west of the line of the Chicago and Northwestern railway between Escanaba and Marquette, 2,400,000,000 feet.

"3. East of the line of the Chicago and Northwestern railway, 2,000,000,000 feet.

"The largest bodies of pine in the northern peninsula are in the counties of Chippewa, Mackinac, Schoolcraft, Marquette, Houghton, and Ontonagon. There is also quite a large body in Keweenaw county, covering perhaps 30,000 acres. Ontonagon county, which extends along the south shore of lake Superior for nearly 100 miles, for 35 miles back from the lake is mostly covered with hard-wood timber, with a little pine along the streams, but not in sufficient quantities to estimate. This is also true of the northern part of Baraga and Marquette counties, extending along the southern shore of lake Superior, a distance of 125 miles from L'Anse to Onota, in Schoolcraft county. There are here a few small bodies of pine scattered through the hard wood, but it is needed by the settlers, and has no export value. The quality of the timber upon the Ontonagon and Presque Isle rivers and the upper Menominee, growing among the hard woods along the south slope of the Penokee iron range, is similar to that on the western shore of the lower peninsula. This timber is, however, somewhat difficult of access. The streams over which it must be driven (the Ontonagon and Presque Isle) are rough, broken, and require considerable improvement. The pine east of the line of the Chicago and Northwestern railway between Marquette and Escanaba, on the east half of the northern peninsula, is of poor quality, and may be classed as 'sapling pine', with occasional groves of what is called 'big sapling' scattered through the hard woods.

"In the upper peninsula of Michigan, according to the Lake Superior Canal Company's reports of examination and estimates of cord-wood, there is an average of about eighteen cords of wood per acre over the whole area of the peninsula, of which two-thirds is hard wood and one-third soft wood.

"In Menominee and Delta counties, the southern part of Schoolcraft county, and the extreme southern part of Marquette county are quite large quantities of tamarack and yellow cedar. From most of these lands the merchantable pine has been removed, and where the fires have not destroyed the cedar and tamarack the railroad companies are cutting the timber and shipping it to the prairies for telegraph poles, ties, and posts. It is stated by the owners of the lands, who long since cut the pine from them, that the cedar and tamarack trees left upon the land have netted them more than the original pine harvested. What makes this timber so valuable is its close proximity to the railroads and the ease with which it can be shipped by rail or over the waters of Green bay. This shows the necessity of preserving this kind of timber for future use, and of not abandoning it for taxes, as has heretofore been done, or allowing it to be destroyed by fires and windfalls.

"There are on the Menominee river some 9,000,000,000 feet of standing pine, one of the largest bodies left in the northwest. More than half of this, however, lies in the state of Wisconsin. About 200,000,000 feet of lumber are manufactured annually upon the Menominee. All the mills upon the river are located at its mouth, in the towns of Marinette and Menomonee, in Wisconsin, and it is considered next to impossible to build more mills at that point. The river is here narrow, and the facilities for holding logs, shipping lumber, dockage, etc., are quite limited in proportion to the amount of timber left in the region tributary to this stream; and this body of pine may therefore be considered to a certain extent in reserve, and likely to outlast many larger ones. There is little danger from fire on this river; the pine which is left grows upon the hard-wood ridges, interspersed with broad areas of swamp."

WISCONSIN.

The great prairies of the central Atlantic region once found their northeastern limits in southern Wisconsin. The forest covering of all the southern part of the state was confined to the bottom lands or open upland groves of stunted oaks of no great extent or of more than local importance. The central part of the state was covered with a dense forest of hard woods, oaks, ash, maple, cherry, birch, and the other trees of the northern forest, through which, upon gravelly or sandy ridges, great bodies of white pine were scattered. These pine forests gradually change in character and decrease in productiveness as they reach northward. Lakes are more common, and swamps of tamarack, cedar, and spruce occupy in the northern part of the state a considerable proportion of the forest area. The pine trees in these northern forests are smaller and more scattered than those farther south, although generally less intermixed with hard woods, and affording lumber of poorer quality.

The forest area has somewhat increased in the prairie region of the state since its first settlement and the consequent decrease of destructive prairie fires. The growth of trees has gradually spread from the bottom lands of the streams to the hills, and the oak forests upon the uplands have gradually encroached upon the prairie, losing their open, park-like character by the appearance of a young growth which has sprung up among the old trees.

The pine has been destroyed along the entire southern borders of the pine belt, along the banks of the principal streams, and from the lines of railroad, while the hard wood has been often greatly injured or destroyed by fire in those parts of the state where pine has been cut. The amount of pine still growing in Wisconsin is nevertheless large, although it should not be forgotten that the best and most easily accessible has already been harvested. What remains is generally remote from actual lines of transportation, and often, especially in the extreme northern part of the state, of comparatively poor quality.

During the census year 406,298 acres of woodland were reported destroyed by fire, with an estimated loss of $725,610. The largest number of these fires was set by farmers in clearing land, or by sparks from locomotives.

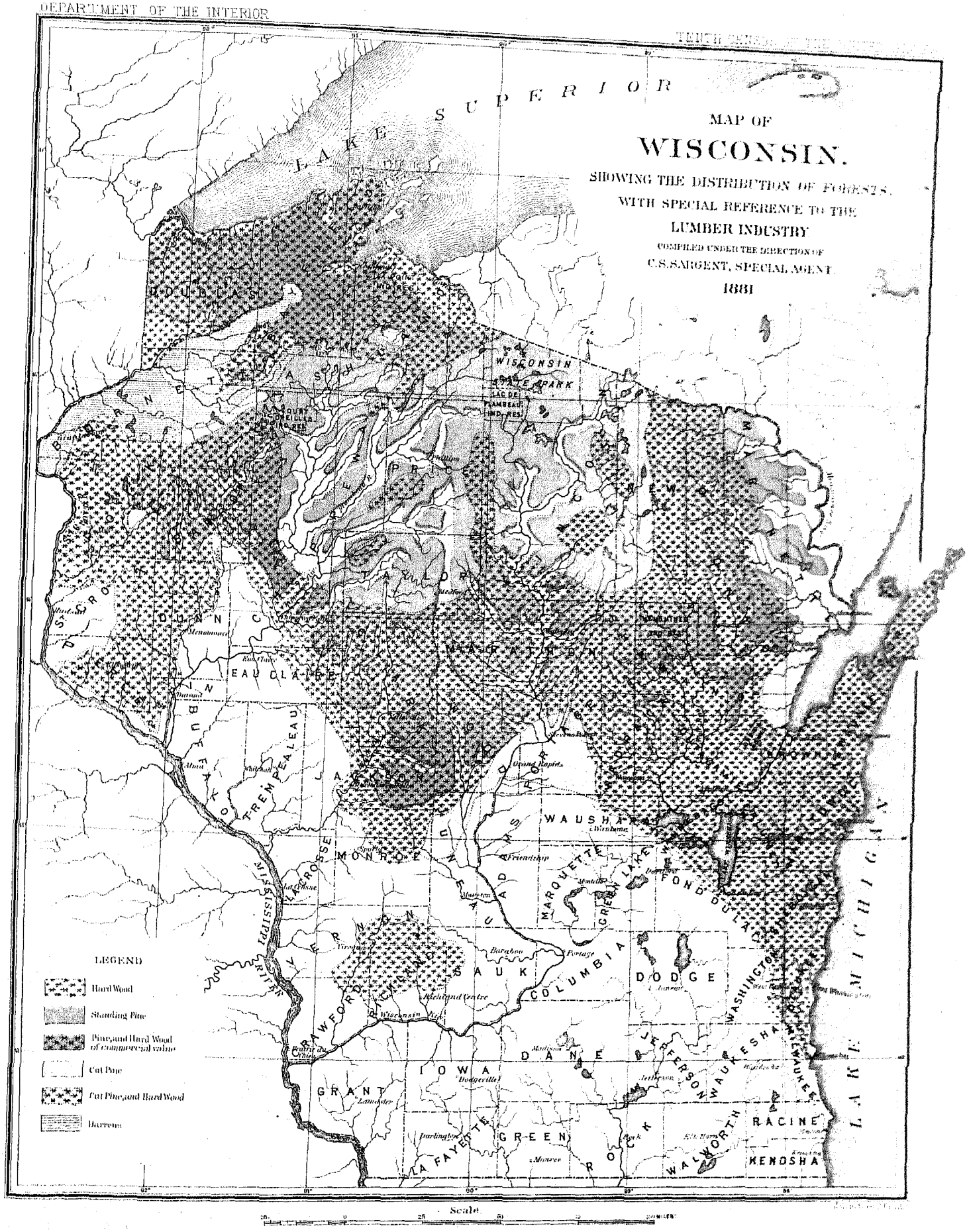
The manufacturers of cooperage stock report a general deterioration and scarcity of the best varieties of hard woods, and the substitution of beech, elm, and other woods for oak.

The following estimates of the amount of timber standing in Wisconsin May 31, 1880, were prepared by Mr. H. C. Putnam:

WHITE PINE (*Pinus Strobus*).

Regions.	Feet, board measure.
Basin of Saint Croix river and tributaries	2,500,000,000
Basin of Chippewa river and tributaries	15,000,000,000
Basin of Black river and tributaries	900,000,000
Basin of Wisconsin river and tributaries	10,000,000,000
Basin of Wolf river and tributaries	600,000,000
Basin of Oconto river and tributaries	500,000,000
Basin of Peshtigo river and tributaries	1,500,000,000
Basin of Menomonie river and tributaries (in Wisconsin)	6,400,000,000
Shore of lake Superior	3,600,000,000
Total	41,000,000,000
Cut for census year ending May 31, 1880 (including 1,007,039,000 shingles and 348,301,000 laths).	2,097,299,000

DEPARTMENT OF THE INTERIOR



Of this amount 485,552,000 feet were manufactured along the Mississippi river in Illinois, Iowa, and Missouri as far south as Saint Louis.

The wooded region in Crawford, Richland, Sauk, and Vernon counties is estimated to contain 12,000,000 cords of hard wood in addition to some timber of commercial value. The cut for the census year ending May 31, 1880 (exclusive of 86,545,000 staves and 7,498,000 sets of headings), was 117,041,000 feet.

Valuable oak timber exists in large quantities in Dunn, Pierce, and Saint Croix counties.

The cedar swamps scattered through the pine belt of the state cover an area of some 1,365,000 acres, and are estimated to contain 62,800,000 posts, telegraph poles, and railroad ties, in addition to large quantities of tamarack and spruce.

Wisconsin is the third state in the importance of its lumber-manufacturing interests. The great centers of manufacture are in the neighborhood of Eau Claire upon the Chippewa river, upon the Wisconsin river, and upon the shores of Green bay and lake Superior. Logs cut in the forests of Wisconsin supply also mills located on the Mississippi river in Illinois, Iowa, and Missouri with material equivalent to nearly 500,000,000 feet of lumber.

The following is extracted from Mr. Putnam's report upon the forests of Wisconsin:

"The southern boundary of the forest coincides with a line extending northwesterly from near the city of Milwaukee on lake Michigan, to the falls of Saint Croix on the Saint Croix river, and the western boundary of the state. This includes the heavy hard-wood as well as the pine forest. There is also, or there has been, a large amount of hard-wood timber in the southeastern part of the state, south of this line, but as no large bodies of forest of commercial value are now standing there, it will not be considered here. Large bodies of hard-wood timber exist in Vernon, Crawford, Richland, and Sauk counties, covering in the aggregate fully 400,000 acres and containing at least 12,000,000 cords of wood. This region, however, is already thickly settled, and the forests are being rapidly cleared for agricultural purposes. No estimate has ever been made of the amount of pine timber standing in Wisconsin at the time of its original settlement; at the present time it is estimated that 41,000,000,000 feet of merchantable pine remain in the state, situated as follows, river basins being taken as the natural divisions of these pineries:

"1. North of the Saint Croix river and upon the lands tributary to that stream there are 2,500,000,000 feet, covering 2,000,000 acres.

"2. On the southern shore of lake Superior, including all the waters tributary to the lake in the state of Wisconsin, extending from the Montreal river on the Michigan line westward to the western boundary of the state, and embracing the Wisconsin pine on the Montreal river and upon the Bad, White, Bois-Brulé, Black, and Left-Hand rivers, 3,600,000,000 feet, covering 1,800,000 acres.

"3. On the Chippewa river and its principal tributaries, the Red Cedar, West Branch, East Branch, Flambeau, Jump, Yellow, and Eau Claire, covering an area of some 6,253,000 acres, with an estimated stand of pine of 15,000,000,000 feet.

"4. In the Black River basin, with an area of 1,000,000 acres, containing an estimated stand of 900,000,000 feet.

"5. In the Wisconsin River basin, with an area of 4,500,000 acres, with an estimated stand of 10,000,000 feet.

"The remainder of the state, lying east of the east line of the Wisconsin River division and north of the southern boundary of the original forest, is divided by rivers as follows: (1) Wolf river, with 600,000,000 feet of pine; (2) the Oconto river, with 500,000,000 feet of pine; (3) the Peshtigo river, with 1,500,000,000 feet; (4) the Menomonee in Wisconsin, 6,400,000,000; making a total in the division east of the Wisconsin of some 7,000,000 acres, with an estimated stand of 9,000,000,000 feet of pine. This makes a grand total of pine forest area in the state of nearly 23,000,000 acres, still containing 41,000,000,000 feet of standing pine. This includes about 200,000,000 feet upon the Menomonee Indian reservation, in the county of Shawano, where very little pine has ever been cut; 100,000,000 feet on the Flambeau reservation, and 200,000,000 feet upon the Court Oreilles reservation. There is no merchantable pine standing on any of the other Indian reservations in the state.

"The quality of the pine in the state of Wisconsin varies largely with the differences in soil. The quality of the pine growing mixed with hard woods upon the southern boundary of the forest and bordering on the prairies was similar to that of the best Michigan pine. This is especially true of timber cut on the Wolf, Oconto, and Peshtigo rivers. The timber originally on the Wolf and Oconto rivers was especially fine. This has been largely cut, although there are still some very fine bodies of the best pine left on the Oconto and the western branch of the Peshtigo and northern branch of the Wolf rivers. The Black River district contained also a large amount of the best upper quality of pine, of which, however, more than half has been cut. The Eau de Galle River basin, in the counties of Pierce, Dunn, and Saint Croix, also contained at one time a large amount of the upper grade of pine, now, however, all removed. This grew among hard-wood timber, on good soil, which, when the timber is cut off, is valuable for farming purposes. The pine in this part of the state did not grow in extensive tracts. It was scattered through the hard-wood timber, from 1 to 10 large pine trees growing on an acre—trees which would scale from 1,000 to 3,500 feet of lumber each. There are still small bodies of this large pine left, but the great bulk of it is gone.

"As we go north from the southern boundary of the forest we enter a lighter soil, where cedar and tamarack swamps are interspersed between the hard-wood ridges. Many of these swamps are natural peat-bogs, covered with cedar, tamarack, and spruce. The tree growth upon them is heaviest near the outer edges, the centers

often being covered with grass or cranberry plants. These swamps, originally the beds of lakes, are now filling up and becoming gradually covered with timber. On the Wolf river the timber was very heavy. Instances are known of 10,000,000 or 12,000,000 feet of pine lumber having been cut from one section of 640 acres in the Lower Wolf River region.

"In the pine forest, away from the large bodies of mixed hard wood and pine previously described, the general character of the timber is about the same, varying somewhat in different localities, but still possessing the same general characteristics and qualities. Where the pine grows in large solid bodies there are many young trees mixed with the older, and the timber is generally of inferior or lower grade. This is true of pine growing about the head of the Flambeau and Wisconsin rivers, and the Menomonee river in Wisconsin. Large pine cannot grow and mature upon very poor soil, and where the soil is poor the trees, after reaching a certain size or age, decay and are thrown down by wind or destroyed by fire. The white pine in Wisconsin does not mature except upon the rich gravelly loam of the ridges.

"The principal points of lumber manufacture at present in Wisconsin are on lake Winnebago, at the cities of Oshkosh and Menasha, which take largely the product of the Wolf and Fox River pineries; at Green Bay and Oconto, which derive their logs principally from the Oconto river; at Peshtigo, on the Peshtigo river; at Marinette, on the Menomonee river; on the Wisconsin river, at Grand Rapids, Stevens Point, Mosinee, Wausau, and Jenny, the terminus of the Wisconsin Valley railroad, and at Necedah, on the Yellow river. Along the Wisconsin Central railroad, from Junction City to Ashland, are mills of more or less capacity at every station, the most important being at Ogema, Ashland, Medford, and Unity. Upon the Black river the principal manufacturing points are La Crosse and Black River Falls. On the Chicago, Saint Paul, Minneapolis, and Omaha railway, at Fairchild, are the large mills of Foster & Co., who are engaged in manufacturing the timber lying between the Black river and the waters of the Chippewa, included in the Chippewa estimate. On the Chippewa river the largest manufacturing establishment is the Mississippi River Logging Company, composed of fifteen of the heaviest concerns upon the Mississippi river. These firms obtain their stock mostly from the Chippewa river, the logs being driven down to its mouth into what is called the 'Beef Slough boom', where they are separated and formed into rafts and towed to the different mills below. This company cuts on the Chippewa about 400,000,000 feet a year. The principal manufacturing points on the Chippewa deriving their logs from its basin are situated at Waubeck, Dunnville, Menomonee, Meridian, and Eau Claire, where several large and important manufacturing establishments are located. Higher up the river the Badger State Lumber Company and the Grand Island Lumber Company are located, and at Chippewa Falls, the county-seat of Chippewa county, the Chippewa Lumber and Boom Company has a large water-mill, with a capacity of 65,000,000 feet a year, besides several smaller concerns. The railroad extending from Chippewa Falls eastward through Chippewa and Clark counties into Marathon county, and joining the Wisconsin Central railroad at Abbottsford, passes through a hard-wood country. Several firms are already established upon this line and have commenced the manufacture of staves and the production of hard-wood lumber for wagons, etc., and are developing a large business. This road runs through one of the finest bodies of hard wood in the state, containing large amounts of oak and maple growing on a fine soil suitable for farming. The Chippewa River country now contains the largest body of white pine of the best quality left in the states of Michigan, Wisconsin, and Minnesota. It is, however, being very rapidly cut.

"It is found in going north toward the heads of the streams that the timber stands more in large groves, and that there is less hard-wood timber mixed with the pine. When the loggers attack these forests they cut clean as they go, the timber being of more uniform size and age, and there being less undergrowth than farther down the streams. It is found, also, that the pineries on the heads of the streams do not hold out as well or yield as large an amount of timber as those farther south, where the forests border on the prairie lands and where the pines grow on better soil. This is true both of the Wisconsin and of the Michigan pineries. The poorer soils in the northern portion of the state do not grow and mature the large sapling forests of pine found in the southern portions of the pine belt. So that, while there is still a large area which has not been cut and which may appear inexhaustible, yet, owing to the fact that the timber lies more in groves, and that there are here wide extents of tamarack and cedar, swamps and open spaces, the ground will be cut over more rapidly than when the forest was first entered. This is true of the pine standing upon all the streams of northern Wisconsin in the Menomonee district—the Wisconsin, the Chippewa, Saint Croix—and on the southern shores of lake Superior. Commencing at Menomonee, on the Chicago, Saint Paul, Minneapolis, and Omaha railway, and running west through the 30 miles of 'big woods', large mills for the manufacture of hard-wood timber and of what little scattered pine there is left are established at Knapp, Wilson, Hersey, Woodville, and Baldwin stations. The principal manufactories in the Saint Croix district are at Hudson, on the Willow river, and at Stillwater, in Minnesota, which receives its logs from the Saint Croix, in Wisconsin, and which, therefore, should be treated as one of the Wisconsin pinery manufactories. At Somerset, on Apple river, there is one mill; there is one at Osceola, upon the Saint Croix, and upon the Northern Wisconsin railroad, which runs through the Saint Croix division; at Clayton, Granite Lake, and Shell Lake are large mills. There are also other mills along this road on the Lake Superior shore. There are mills of small capacity at Superior City, Bayfield, and Ashland; the latter receive their logs by the Wisconsin Central railroad from the Bad River pinery.

"On the Eau Claire river the timber is small and sound, growing very thick and long; there are frequent instances where 1,200,000 or even 1,500,000 feet of lumber have been cut upon a 40-acre lot. One tree was cut on Jump river some years ago which scaled 7,000 feet of lumber. The general character of this timber, especially upon the main Chippewa or West Branch and a portion of the Flambeau, is called 'big sapling pine'. Of the true cork pine very little is found in the northern part of Wisconsin, probably because the soil is not strong enough to permit its full development. The general character of the timber upon the Wisconsin river is very much the same as that upon the main Chippewa. There are instances of very fine pine having been cut in the hard-wood forest upon the lower part of the river, and some fine groves are found even as far north as the Tomahawk and East Branch. The Flambeau river, or East Branch of the Chippewa, has also, in ranges 2 and 3 east, extending from townships 35 to 41 north, inclusive, some excellent bodies of upper-grade pine.

"On the Jump river are some fine bodies of pine, nearly approaching in quality Michigan cork pine and running largely to 'uppers'. This is true also of the pine upon the Yellow river, where the timber grows largely scattered among hard woods and is of fine quality. One of the finest bodies of pine in Wisconsin is that which belongs to Cornell university, lying in townships 33 to 38, ranges 8 and 9, in the highest part of Chippewa county, on the divide between the Chippewa and Red Cedar rivers. On this body frequent estimates of 1,000,000 feet to 40 acres have been made. On the Saint Croix river are many barren areas timbered with scrub pine, patches of Norway pine, and small black and white oak. These barrens cover about 700,000 acres of the Saint Croix region. The soil is sandy, and fires run over the country every year. South of these barrens, in Polk, Barren, Saint Croix, Dunn, and Pierce counties, is a tract of very valuable hard-wood land, upon which the greatest portion of the timber is now standing, although settlements are already largely scattered through this region. This body of hard wood contains a large amount of valuable white-oak stave timber and much timber suitable for general manufacturing purposes. It is being, however, rapidly destroyed by settlers and by the fires incident to agricultural and logging operations.

"In Clark county, which lies partly in the Chippewa and partly in the Black River region, are large bodies of hard-wood timber as yet uncut and growing upon land valuable for farming purposes. This growth extends as far north as the northern line of the county. The same body of timber extends east through Marathon and Wood counties, and is particularly fine in the western portions. The same body of hard-wood timber continues east toward lake Michigan, including the counties of Portage, Waupaca, Shawano, Outagamie, Winnebago, Brown, Kewaunee, Manitowoc, Calumet, Fond du Lac, Sheboygan, and Ozaukee. Large tracts in these counties are, of course, cleared and settled; still they contain large bodies of unoccupied hard-wood timber, and the opportunities for cheap farms are plenty.

"Of the forest region proper of Wisconsin, fully 5 per cent. is not covered with timber; this includes swamps, lakes, rivers, bottoms, etc. In the extreme southern part of the forest area, over a region from 35 to 50 miles in width, the hard wood predominates, only about one-fifth of the forest growth being pine. North of this hard-wood region proper, perhaps one-half of the forest growth is pine and other soft woods and the rest hard woods. Hemlock is scattered through the pine forest outside of the heavy hard-wood areas. A careful estimate of the hemlock timber now standing gives the following results, the divisions agreeing with those used in estimating the standing pine: On the Chippewa river, upon 3,000,000 acres, 2,500,000,000 feet of hemlock; on the Saint Croix river, upon 1,000,000 acres, 500,000,000 feet of hemlock; on the Black river, upon 350,000 acres, 100,000,000 feet of hemlock; in the country east of the Wisconsin River division, and including the Wolf, Oconto, Peshtigo, and Menomonee rivers and their tributaries, upon 3,000,000 acres, 1,500,000,000 feet.

"The total area in the state on which hemlock timber grows is about 10,500,000 acres, containing, roughly, 5,500,000,000 feet. The quality of the hemlock timber in Wisconsin is not so good as that grown in New York and northern Pennsylvania, although it is valuable for its bark, and the timber when peeled can be driven down with the pine and sawed at the mills into dimension stuff for use where coarse lumber is required.

"Generally, therefore, the forests of Wisconsin may be divided into the hard-wood lands already described, along the southern borders, from which the pine has been mostly cut; north of this, and extending northward somewhat indefinitely, the mixed growth of hard wood and pine, growing upon soil adapted for agricultural purposes. The open meadows in this region are covered either with grass or cranberry marshes, alike valuable to the lumber and farming interests. About the head of the Flambeau river are large open spaces running into groves of heavy pine timber. These open spaces, once lakes or swamps, are drying up and the timber is gradually spreading over them. There are bodies of timber scattered through the southern portions of the state outside of the original forest area, but the amount of this timber is relatively so small that it cannot be considered of commercial importance, and hardly supplies the wants of the population occupying the thickly-settled southern counties.

"Five thousand men are employed in the pineries of the Chippewa river. They are expected to cut during the logging season about 600,000,000 feet of logs, or an average per man of over 100,000 feet. This rule is not applicable to the northwestern pineries generally, for in Michigan, as the timber is now farther from the streams, the average cut per man is not as great, and 80,000 feet per man would perhaps be a fair average, taking the pineries of the whole northwest.

"The annual increase or growth of timber is counterbalanced by the annual waste by windfalls and the natural decay of the old trees. The loss to the forest by fire is an unknown quantity, but it is quite a large amount, probably 5 per cent. of the whole. The lumbermen waste the log which runs into the top of the tree; this is knotty, but usually sound, and would make good merchantable lumber. It is left in the woods, however, because there is a good deal of work in trimming the knots and cutting off the limbs. From an ordinary-sized tree four 16-foot logs are usually taken, the rest being left. Often this top log is 22 inches in diameter at the butt and will scale from 100 to 120 feet. Loggers are paid so much per thousand feet by the lumberman, and the amount they receive is so small that they cannot afford to spend the time to finish up and take out the fifth or last log, which is therefore left in the woods and lost. Nearly one-tenth of the timber, therefore, is left in the woods and lost. The fires about the old choppings, or where lumber operations are going on, are principally caused by the carelessness of woodsmen in hunting up land-lines, or of driving-crews on the river in the spring who leave their fires, or by explorers in the forest during the month of May or June leaving their camp fires burning. In all the old cuttings the dried pine boughs and other timber left on the ground get very dry, and fire once started burns with great rapidity and violence.

"As a matter of fact, more than half the area from which pine forests have been cut in the northwest is sooner or later burned over. The fire destroys the young trees and changes the nature of the surface of the ground, so that the next crop which comes up consists of briers and poplars, and then hard woods. When pine is cut off or burned it does not come in again, and I have never seen any old choppings of pine come up with pine again, even when some trees were left and the ground had not been burned, although where a few large trees only are removed from a pine forest growing on good soil the small trees left standing, if protected from fire, will continue to grow."

MINNESOTA.

The Northern Pine Belt finds in Minnesota its extreme western limit in the United States in longitude 95° 30′, and its southwestern limit near the forty-sixth degree of latitude. Along its southern and western borders a narrow territory covered with an open growth of hard wood separates the forests of pine from the prairie, which occupies all the southern and western portions of the state.

The same general features which characterize the pine belt of Wisconsin extend into Minnesota. The pine in the southern portion, confined to gravelly ridges, is scattered through forests of hard wood. Farther north the forest changes in character, the pine being small and of inferior quality. Broad areas of barren land covered with stunted birch, gray pine, and scrub oak occur, while the whole country is thickly studded with lakes and with tamarack and cedar swamps. North of the Mississippi River divide the country is more open; the forest is stunted and of little value, and pine is only found in small, scattered clumps mixed with spruce, tamarack, and yellow cedar. The forest growth here occupies perhaps two-thirds of the rocky or swampy surface of the ground. Its productive capacity is not large, and the northern part of the state is not adapted to lumbering operations.

The pine has been removed from the principal streams of the state, and that which remains, except in the region tributary to lake Superior and in the vicinity of Red lake, is now inaccessible or of comparatively inferior quality. The best hard-wood forests of the state, as in Michigan and Wisconsin, have suffered seriously by fires started in abandoned pineries, or in clearing land for agriculture.

During the census year 250,805 acres of woodland were reported devastated by fire, with an estimated loss of $1,395,110. The largest number of these fires was set in clearing land or by sparks from locomotives.

The manufacture of cooperage stock to supply the large flouring-mills of the state is an important industry. Manufacturers report a growing scarcity and general deterioration of material. Basswood, elm, and ash are largely used; oak is inferior in quality to that grown farther east and south.

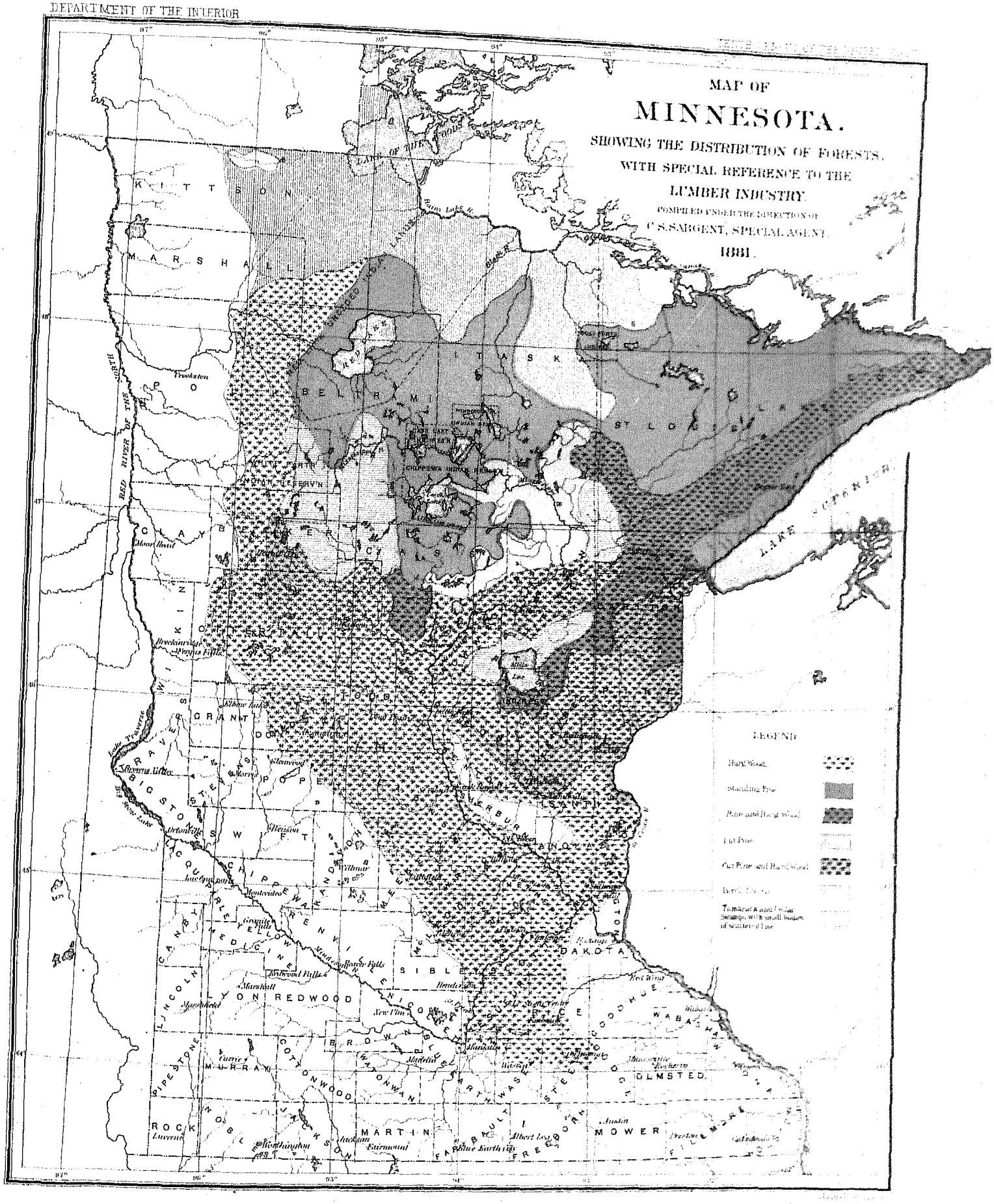
The following estimates of the amount of pine timber standing in Minnesota May 31, 1880, were prepared by Mr. H. C. Putnam:

WHITE PINE (*Pinus Strobus*).

Regions.	Feet, board measure.
Mississippi river and tributaries	2,000,000,000
Rainy lake and Rainy Lake river	300,000,000
Red Lake river and other tributaries of the Red river	600,000,000
Saint Louis river and tributaries	3,500,000,000
Shore of lake Superior	870,000,000
Total	8,170,000,000
Cut for the census year, ending May 31, 1880 (including 187,836,000 shingles and 88,088,000 laths).	540,997,000

In the belt of hard wood extending west and south of the pine region, and consisting of white, red, and burr oak, sugar-maple, poplar, etc., it is estimated that 3,840,000 acres of forest remain, capable of yielding an average

DEPARTMENT OF THE INTERIOR



of 15 cords of wood to the acre, or 57,600,000 cords. The cut for the census year ending May 31, 1880 (exclusive of 7,825,000 staves and 547,000 sets of headings), was 36,884,000 feet.

Minnesota is the eighth state in the importance of its lumber-manufacturing interests. The principal centers of manufacture are Minneapolis, upon the Mississippi river, the Saint Croix river in Washington county, the Mississippi river in Anoka county, and Duluth, near the mouth of the Saint Louis river.

The following is extracted from Mr. Putnam's report upon the forests of Minnesota:

"The great hard-wood forest of Minnesota lies to the south and west of the pine forest, extending north and northwest from Freeborn and Mower counties on the southeast into Marshall county, and to within 50 or 60 miles of the boundary-line between Canada and the United States. This body of hard wood, which is some 300 miles long by about 20 miles wide, borders upon the prairie, and is the extreme western body of timber of any commercial value east of the Rocky mountains. This forest covers about 3,840,000 acres of land generally valuable for agricultural purposes, besides its timber, which will average about 15 cords to the acre. The surface of the land is level or gently undulating, well watered, particularly the so-called 'park region' which lies in Becker, Otter Tail, Douglas, Stearns, and Todd counties, and in fact extends through Wright, Hennepin, Carver, Le Sueur, Rice, and Steele counties.

"North and east of this belt of hard wood the pine forests commence at a point where the southern line of the Wisconsin forest crosses the Saint Croix river, near Taylor's Falls. They extend northwesterly through the counties of Chisago, Isanti, Mille Lacs, Benton, Morrison, Todd, Otter Tail, Becker, Polk, and Beltrami, nearly parallel to the line of the hard-wood forest, and, crossing Red Lake river, extend round to the north of Red lake, and thence easterly, reaching the shore of lake Superior at the Grand Portage.

"The general character of the pine in Minnesota is similar to that of northern Wisconsin, although it contains more sapling pine and a smaller percentage of 'uppers.' It is generally somewhat scattering and in smaller groves. Large areas of barren land within the forest proper are covered with birch, through which are scattered patches of small pine, while large areas of swamp bear only tamarack and cedar. The pine of Minnesota is estimated as follows:

"1. On the portion tributary to the Rainy lake and Rainy Lake river, including the Big Fork, the Little Fork, and the Vermillion rivers, 300,000,000 feet. This stands upon streams which flow northward. This pine will naturally be sent to Manitoba.

"2. On the northern shore of lake Superior, east of Duluth, and covering the waters tributary to lake Superior, of which very little is surveyed and no area is given, 870,000,000 feet.

"3. On the waters of the Saint Louis, including the Cloquet, White Face, and other small streams, 3,500,000,000 feet.

"4. On Red Lake river and its tributaries. The great body of pine in this division is principally upon Red lake and Red Lake river. It is estimated to contain 600,000,000 feet, although it is nearly all unsurveyed.

"5. On the Mississippi river and tributaries above Minneapolis, 2,900,000,000 feet.

"About one-half of the pine has been cut in Carlton county; it has all been cut in Pine county with the exception of that growing in a few townships. It has nearly all been cut in Chisago, Kanabec, Morrison, and Crow Wing counties. A great deal of pine, too, has been cut in Cass county, while Todd, Otter Tail, and Wadena have all been cut over. The principal bodies of pine now remaining are located in Cook, Lake, Saint Louis, Cass, Itasca, and Beltrami counties. There were a few thousand acres growing on the Roseau river, where it runs into northwestern Minnesota, but this has all been cut by the Canadians. There is no hemlock or spruce in Minnesota. There are occasional ridges of hard wood within the pine forest, as in Wisconsin and Michigan.

"A large portion of the northern part of the state is as yet unsurveyed and but little known, except that, in the region extending from 30 to 100 miles south from the international line, there is little pine of commercial value. It is an open country, full of bogs, swamps, rocks, and wide areas of worthless land; this region extends from the Arrow river clear through to the international line, south and west of the Lake of the Woods, and to the Vermillion lake.

"Along the line of the Northern Pacific railroad and north and east of the Mille Lacs country are large swamps covered with tamarack timber of commercial value. Through this country are many marshy lakes containing floating islands, lands in process of formation by the accumulation of vegetation. The timber in this district is growing and increasing, and if fires can be kept out of the tamarack and cedar timber the small pine will grow rapidly.

"The timber which grew on the Saint Croix river in Minnesota was tributary to Stillwater, and has all been cut and manufactured there.

"The principal manufactories of pine on the Mississippi river are at Minneapolis.

"FORESTS ON INDIAN RESERVATIONS.

"Referring to the Red Lake Indian reservation in Minnesota, and other Indian reservations on which the pine remains uncut, amounting in the aggregate to 1,000,000,000 feet, it may be said that they are nearly all unsurveyed, and are generally covered with a heavy pine forest, and that the lands are unfit for agricultural purposes and only

valuable for the pine timber which grows upon them. These reservations should be held as long as possible by the government as a timber reserve. They should not be surveyed and subdivided except so far as may be necessary for their protection, and they should not be offered for sale until some necessity, now unforeseen, arises for their disposal. The 1,000,000,000 feet of pine should be held until the amount for which it can be sold is needed by the Indians, or until a price near its value can be obtained for it. By selling the land now the value of the timber cannot be realized, while the interest of the settlers who may hereafter enter upon the prairies would seem to demand that some reservation of pine should be made for them, if possible. The proposition to bring these lands into market, subject to pre-emption and homestead entry, is against the interest of every one except the few worthless tramps and irresponsible persons who may seek to enter and procure a title to these lands; and even if the land was so open to homestead and pre-emption entry, the aim and purpose of these laws could not be carried out, for no farms will be made nor homesteads improved in this Indian country.

"The White Earth Indian reservation is largely covered with hard wood, there being no pine upon more than a quarter of its area. The land is desirable for agricultural purposes, and may be utilized for the settlement of Indians, or under the homestead and pre-emption laws by whites, but the pine lands are unfit for cultivation, and the homesteading or pre-empting of them should not be allowed."

IOWA.

Iowa lies within the prairie region. The broad bottom lands along the river of the eastern part of the state once bore heavy forests of broad-leaved trees. Farther west the tree growth was less heavy in the narrower bottoms. All over the state, however, forests lined the streams and often spread, especially in the southwestern counties, over the uplands. Since the first settlement of the state the forest area has increased by the natural spread of trees over ground protected from fire, and by considerable plantations of cottonwood, maple, and other trees of rapid growth made by farmers to supply fuel and shelter.

The natural forests have been everywhere largely culled of their most valuable timber, and in spite of their increased acreage are, in their commercial aspect, in danger of speedy extermination. Manufacturers of cooperage stock and others using Iowa timber report great scarcity and general deterioration of stock.

During the census year 11,017 acres of woodland were reported destroyed by fire, with an estimated loss of $45,470. These fires were largely the result of carelessness in clearing land.

Iowa is the ninth state in the importance of its lumber-manufacturing interests. It owes its position to numerous large mills situated along the Mississippi river entirely supplied with logs from the pineries of Wisconsin. The amount of Iowa-grown lumber manufactured is insignificant.

MISSOURI.

Southern and southwestern Missouri was originally covered with a dense forest of hard woods, through which in the southern counties extensive areas of the short-leaved pine (*Pinus mitis*), covering gravelly ridges and the low Ozark hills, were common. The northern and western limits of the true forest region may be defined by a line entering the state from the southwest, in the southern part of Jasper county, and passing northeasterly through Dade, Cedar, Saint Clair, Henry, Benton, Morgan, and Cooper counties, and then northward to the borders of the state. West of this line the timber is largely confined to the broad bottom lands, in belts often 2 or 3 miles in width. Farther west these become narrower and less heavily timbered. The extreme northwestern counties, Atchison and Nodaway, are almost destitute of timber.

The forests of southeastern Missouri still contain great stores of valuable timber, although the best trees have been cut in the neighborhood of all settlements, and for a distance varying from 5 to 20 miles back from all lines of railroad. This is especially true of the best white oak and of black walnut, once common, but now almost exterminated in all parts of the state.

Manufacturers of cooperage stock report a growing scarcity of material everywhere, and are now forced to obtain oak from Arkansas and elm and basswood from the rivers of southern Illinois and Indiana. The further development, however, of the railroad system of southern Missouri will make available for manufacturing purposes a large amount of valuable timber now remote from transportation.

During the census year 783,646 acres of woodland were reported destroyed by fire, with an estimated loss of $294,865. These fires were traced to careless hunters, to fires set in clearing farming land, to sparks from locomotives, etc.

A gratifying improvement in the condition of the forest in the parts of the state first settled has followed the enactment of a fence law preventing the general ranging of stock through the timber-land. A young growth has sprung up among the older trees and along the borders of woodlands protected from browsing animals, and these young forests are valuable in their prospective yield and as an indication of the methods which must be adopted to preserve and perpetuate the forests of the whole Atlantic region.


DENSITY OF FORESTS
COMPILED UNDER THE DIRECTION OF
C. S. SARGENT, SPECIAL AGENT
1883.
Scale
STAT. MILES
LEGEND.
I Under 1 cord per acre
II From 1 to 2 "
III " 2 " 5 "
IV " 5 " 10 "
V Over 10 "
RENVILLE
BOTINEAU
ROLETTE
CAVILIER
PEMBINA
WALLETTE
MOUNTRAILLE
BERTHOLD INDIAN RES.
STEVENS
Mc HENRY
DE SMET
RAMSEY
GRAND FORKS
DEVILS LAKE IND. RES.
HOWARD
WILLIAMS
SHERIDAN
GINGRAS
FOSTER
TRAILL
MERCER
BURLEIGH
KIDDER
STUTSMAN
BARNES
CASS
Fargo
Bismarck
BILLINGS
STARK
MORTON
EMMONS
LOGAN
LA MOURE
RANSOM
RICHLAND
BOREMAN
CAMPBELL
Mc PHERSON
SISSETON AND WAHPETON INDIAN RES.
BROWN
DAY
SIOUX
WALWORTH
EDMUNDS
RUSK
DRIFTING GOOSE IND. RES.
GRANT
ASHMORE
FAULK
MANDAN
SPINK
CLARK
CODINGTON
DEUEL
DELANO
SULLY
HAMLIN
STANLEY
HAND
BEADLE
KINGSBURY
BROOKINGS
LAWRENCE
CHEYENNE
HUGHES
WINNEBAGO RES.
PENNINGTON
BUFFALO
CROW CREEK IND. RES.
MINER
LAKE
MOODY
WHITE RIVER
PRATT
PRESHO
LYMAN
AURORA
ZIEBACH
CUSTER
BRULE
HANSON
Mc COOK
MINNEHAHA
SHANNON
LUGENBEEL
MEYER
TRIPP
BRULE SIOUX IND. RES.
GREGORY
CHARLES MIX
DOUGLAS
HUTCHINSON
TURNER
LINCOLN
YANKTON INDIAN RES.
FORSYTHE
BON HOMME
YANKTON
Yankton
TODD
PONCA IND. RES.
CLAY
UNION
Julius Bien & Co. lith.

DAKOTA

Missouri is the tenth state in the importance of its lumber-manufacturing interests. It owes its position in part to large mills located upon the Mississippi river manufacturing logs cut in the forests of Wisconsin. A much larger amount of lumber, however, in the aggregate, both pine and hard wood, is produced in numerous small railroad mills located along the line of the Iron Mountain and other railroads running through the southern part of the state.

Saint Louis is an important center of lumber distribution. It receives a large portion of the Wisconsin pine crop by raft, Michigan pine by rail, and southern pine and hard woods by rail and river.

DAKOTA.

Dakota, with the exception of its river lands and the small territory between the north and south forks of the Cheyenne river, is practically destitute of timber. The bottoms of the principal streams contain extensive groves of hard wood. As far west as the James river timber exists about the shores of the larger lakes, and upon the Low Turtle and Pembina mountains of the northern boundary, occasionally ascending the *côtes* or sides of low tables rising from the prairie. The Black hills, an extreme outpost of the Rocky Mountain system, were once heavily timbered. The yellow pine of the Pacific region is here mingled with the white spruce, the canoe birch, the burr oak, and the elm of the eastern forests, while poplars of the Atlantic and Pacific regions grow side by side.

Much timber has already been cut along the eastern rivers to supply the wants of a rapidly-increasing agricultural population, and the isolated pine forests of the Black hills, separated by hundreds of miles from any equally large or valuable body of building timber, have already suffered serious inroads. The best and most accessible pine has been cut and manufactured into lumber or consumed as fuel in the silver mines and stamping mills to which this region owes its population, and much timber has been allowed to perish in the fires which of late years have often swept through these forests.

The principal center of lumber manufacture is Deadwood, in the Black hills, where a comparatively large amount of pine is sawed. In the eastern counties a little oak and elm is manufactured, for the most part in small portable mills.

The following extracts are made from Mr. H. C. Putnam's report upon the eastern portions of the territory:

"Along the whole length of the Missouri river in Dakota there is a belt of hard-wood timber in the bottoms in bodies of from 100 to 500 acres in extent. This timber sometimes grows continuously, but more often there are open spaces between the groves. About three-fourths of the trees are burr oak, the remainder sycamore, cottonwood, green ash, box-elder, poplar, willow, etc. A similar forest growth lines the banks of the Red river north of Fort Abercrombie as far as Fort Pembina, near the international line. This strip of timber averages perhaps forty rods in width, and consists of the same varieties of trees that grow upon the Missouri river.

"In the Pembina mountains and west of Fort Pembina, on the Tongue and Pembina rivers, there are bodies of timber, generally of stunted growth, lying mostly along the streams or about the Pembina mountains in groves of from 160 to 3,000 acres in extent. This timber is situated principally in the two northern tiers of townships of Pembina county. It has no value except as fuel. The next body of timber in Dakota is in the neighborhood of Devil lake; it aggregates some 25,000 acres, distributed as follows: At Wood lake, some 20 miles north of Devil lake, there are 1,000 acres; on Graham's island, a promontory on the north shore of Devil lake, near the northwest end, are 2,500 acres of timber; east of this, on the north shore of the lake, are two groves of about 500 acres; at Rock island, which is really a promontory running into the lake, are 3,800 acres of timber; around the east and north shores, and around the whole southern shore of the lake, past Fort Totten to the extreme west end, are some 15,000 acres of forest adjacent to Devil lake; at Stump lake, a lake some 15 miles in diameter on the north side of Devil lake, there are 1,400 acres of timber; and commencing some 10 miles south of Fort Totten, and extending down along Cheyenne river into township 146, range 56, in Traill, Foster, and Grand Forks counties, are about 10,000 acres of timber. The valley here is only 1 or 2 miles in width, and the timber is generally distributed through it. Probably seven-eighths of all this Devil Lake timber is burr oak; the remainder is sycamore, green ash, etc. This timber in many places grows large, sometimes 30 or 40 feet to the first limb, and is valuable for fuel, for the construction of log houses, and for general use by settlers in the absence of other and better material.

"In the Turtle mountains, in Bottineau and Rolette counties, and extending into the British possessions, is quite a large tract of timber, principally oak of short, scrubby growth, and only valuable as fire-wood. A body of timber from 1 mile to 5 miles in width extends for 150 miles along the Mouse river, in the counties of Bottineau, McHenry, Stevens, and Renville. This timber is composed of burr oak, box-elder, sycamore, green ash, etc., and is suitable for fire-wood, house-building, and rough construction."

Mr. Robert Douglas, of Waukegan, Illinois, contributes the following remarks upon the forests of the Black Hills region, of which he made a critical examination:

"From Fort Meade the stage road runs about 2 miles along the base of the hills, and then follows up through heavy timber, gaining an altitude of over 1,500 feet above the fort when within 2 miles of Deadwood; thence down a

steep grade of about a mile until the valley is reached, and then up the valley by an easy grade to Deadwood. Five days' driving through the hills from the base of the foot-hills to one of the highest peaks shows little variation in the species of forest trees. The yellow pine (*Pinus ponderosa*) is the only tree of much value in the hills, and composes nineteen-twentieths of the forest, generally covering the hills from base to summit. The trees are larger and stand closer together than in Colorado, and grow here, too, more rapidly than farther south, as is shown by the width of the annual rings of growth and the shoots upon the standing trees. This is the only tree used for lumber at the saw-mills, and no other is used in the mines. The white spruce (*Picea alba*) grows principally near the water-courses, and here the largest trees of that species are to be found. It is scattered, however, through the pines even within 50 feet of the summit of Terry's peak. It is condemned by both saw-mill proprietors and miners as lacking strength and being very knotty, which cannot be doubted, as it retains its lower branches with wonderful tenacity, even when growing closely and in dense shade. These two species comprise all the *Coniferæ* in the Black hills, with the exception of a prostrate juniper and rare specimens of the red cedar. The burr oak is found in the valleys extending into the foot-hills and along the creeks for 40 or 50 miles into the plains. It is short, gnarly, and apparently of little value, although exceptional trees in the valley are of fair size. In the narrow valleys and along water-courses are found the common cottonwood, black willow, narrow-leaved cottonwood, green ash, white elm, box-elder, ironwood, canoe birch, and quaking aspen; in the hills canoe birch, mountain ash, hazel, choke cherry, and juneberry are found growing side by side with the snowberry and mahonia of the Pacific region. The little aspen and the canoe birch perform the same service the aspen does in Colorado, and cover the ground after the timber is burned off, thus making a shade in which the pine seedlings find protection from sun and wind, and finally repossess the hills. On the banks of the numerous creeks intersecting the 'bad lands' and plains from the Missouri river to the Black hills, box-elder, white elm, green ash, black willow, cottonwood, choke cherry, wild plum, and buffalo-berry occur, but the canoe birch is not found below the foot-hills, where it grows along the creeks 6 or 8 inches in diameter, or as a low shrub upon the hillsides.

"The region occupied by the Black Hills forests is 80 miles in length north and south, and about 30 miles wide from east to west. Forest fires are not so frequent nor so disastrous as in Colorado, although the 'big burning' of 1865, near Custer's peak, is estimated to have extended over 400 square miles. The yellow pine is largely reproducing itself over the whole of this area, the trees being now 3 or 4 feet high. As far as my observation went, this reproduction of the yellow pine over the old 'deadenings' is almost universal through the hills, although rarely or never seen in Colorado, and even in northern Wisconsin and the Michigan peninsula scarcely a single young pine has appeared in the whole burned district of 1871.

"The timber is disappearing rapidly in the vicinity of Deadwood, Lead City, Terryville, and Central."

NEBRASKA.

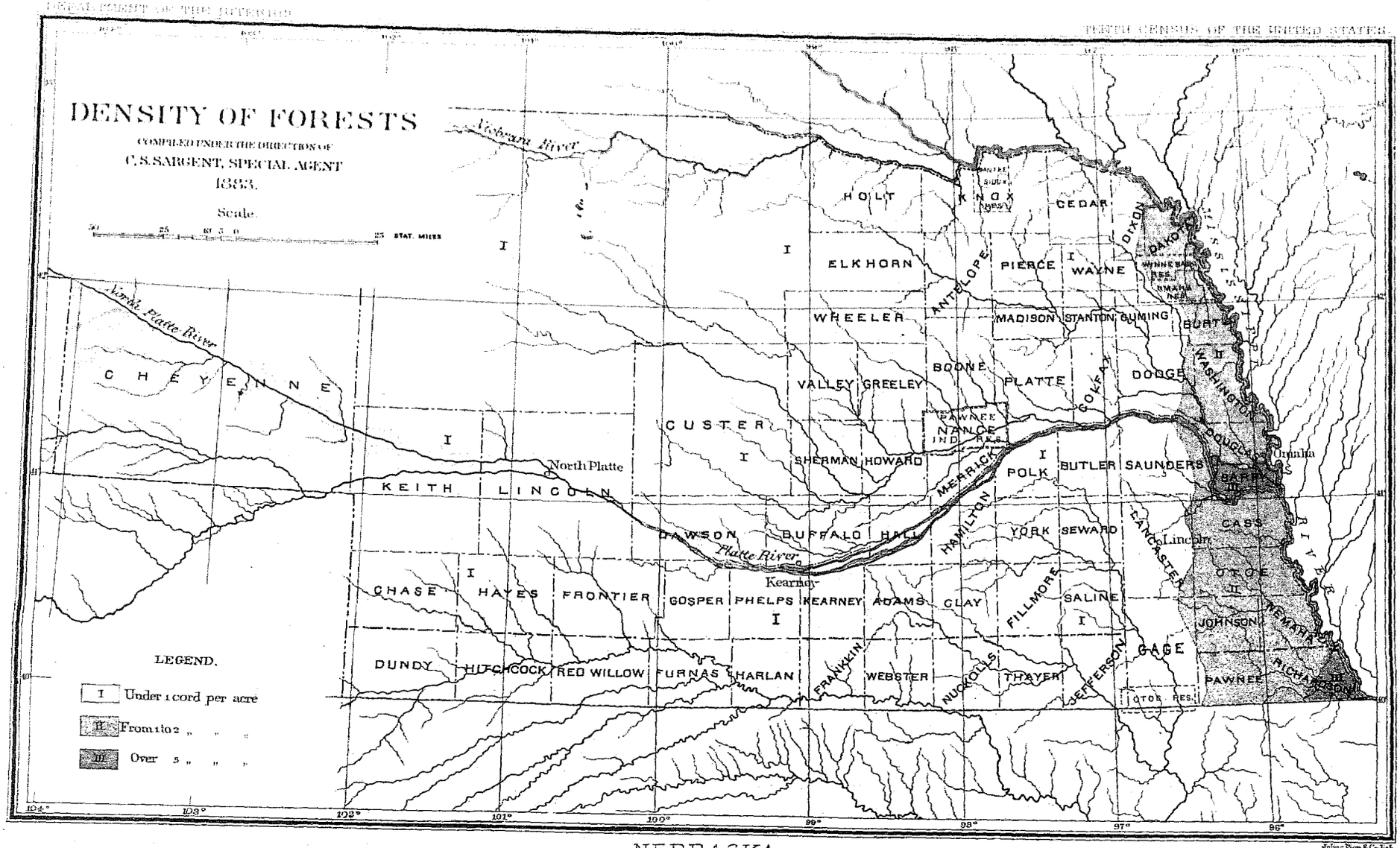
The forest growth of Nebraska was once confined to the eastern part of the state; the broad bottom lands of the Missouri and the lower Platte rivers contained groves of large oak, walnut, ash, and box-elder of considerable extent. These, under favorable conditions, spread to the bluffs and uplands. Westward the tree growth gradually became more scanty and stunted, until, west of the one hundredth meridian, only the large streams were lined with a few small cottonwoods and willows.

The best trees have already been culled from the scanty forest growth of the state, and if the area of natural woodland has somewhat increased along its eastern borders since the settlement of the country and the diminution of prairie fires, these forests are, in their commercial aspect, of little importance. Many small plantations of cottonwood and other trees of rapid growth have been made in connection with farms in the eastern counties, and these in some cases already furnish much-needed shelter to buildings and crops, and supply domestic fuel.

The lumber-manufacturing interests of Nebraska are not important. Mills at Omaha, the principal manufacturing center, saw cottonwood and a little walnut and oak, hauled to them from the neighborhood of the city, and small portable mills at other points along the Missouri saw a little cottonwood and such logs as the country tributary to them can furnish. The product of all the Nebraska mills is consumed in supplying the local demand.

KANSAS.

The heavy forest of the Mississippi basin just reaches the extreme southeastern corner of Kansas, covering nearly one-third of Cherokee county. North of this, and occupying the remaining eastern border of the state, a prairie region varying in width from 30 to 100 miles is still heavily wooded with valuable timber along the streams, the forest growth occasionally extending and covering areas of upland. West of this region of mixed prairie and woodland the timber is confined to the banks of streams. It is often, east of the ninety-seventh meridian, of considerable size and value, occurring in sufficient quantity to supply the most pressing wants of the agricultural population of this part of the state. West of the ninety-seventh meridian the tree growth gradually diminishes in vigor. Trees are here confined to the immediate banks of the large streams, and are small and of little value. West of the ninety-ninth meridian a few small stunted willows and cottonwoods, scattered at wide intervals along the large streams, represent the only forest growth of this arid region.



NEBRASKA

Julius Bien & Co. lith.

A large amount of lumber is manufactured in the eastern counties in proportion to the extent of their forest area; but much of the best timber of the state has been cut, and Kansas must soon depend, even more than at present, upon the forests of Arkansas and Louisiana for its lumber supply.

Considerable plantations made in the eastern and southeastern counties by railroads and in connection with farms promise abundant success. All attempts, however, to raise trees in the arid central and western parts of the state have resulted in failure.

During the census year 7,080 acres of woodland were reported destroyed by fire, with an estimated loss of $14,700. The largest number of these fires originated upon the prairie.